

Appendix F-BMPs

General discussions of Best Management Practices (BMP's) and their effectiveness are found in the General Water Quality Best Management Practices, Pacific N.W. Region, 1988 and Seyedbaghei, K. 1996. BMP's for the Silvies Canyon Restoration Project are identified below, as well as an estimation of the ability to implement BMP's, their anticipated effectiveness, timing and responsibility for monitoring. For protection of resources, see Design Features and Mitigation Measures in this document.

1. Maintain all Riparian Habitat Conservation Areas (RHCAs). INFISH provides default standard widths for RHCAs based on one of four categories: fish bearing; perennial, non-fish bearing; ponds, lakes, wetlands greater than 1 acre; and intermittent or small wetlands. The following standard widths, applied to each side of the stream, define the RHCAs for this project:

Fish-bearing streams (Category 1):

- The area on either side of the stream extending from edges of active stream channel to the top of the inner gorge, or the outer edges of the 100-year floodplain, or the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), which ever is greatest.

Permanently flowing non-fish-bearing streams (Category 2):

- The area on either side of the stream extending from edges of active stream channel to the top of the inner gorge, or the outer edges of the 100-year floodplain, or the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 150 feet slope distance (300 feet, including both sides of the stream channel), which ever is greatest.

Ponds, lakes, reservoirs, and wetlands greater than 1 acre (Category 3):

- The area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond, lake, which ever is greatest.

Intermittent streams and wetlands less than 1 acre (Category 4):

- The intermittent stream channel and the area to the top of the inner gorge
- The intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation.
- The area to the edge of the channel, wetland to a distance equal to the height of one-half site potential tree, or 50 feet slope distance, which ever is greatest.

In the GIS stream layer, Class I and II streams are Category 1, Class III streams are Category 2, and Class IV streams are Category 4.

2. Ephemeral stream channels should have protections to minimize equipment disturbance of duff and soil, and should not be used as skid trails, landing sites, or as road locations. Ephemeral draws, not within RHCAs, are to meet the following down wood requirements to reduce risk of upward migration and channel initiation: retain all wood embedded in the soil; retain at least 5 pieces of wood >12" diameter and >20' in length per 1000' of draw bottom (average 1 piece per 200'); retain at least 20 pieces of wood >6" diameter and >10' in length per 1000' of draw bottom (average 1 piece per 50'). Ephemeral draws with a gradient of 5% or more will need to be visited by the hydrologist to determine if any additional site-specific mitigation is required.

3. All temporary roads shall be obliterated at the completion of their intended use (see BMP R-23) - NFMA requires that all temporary roads be returned to resource production within 10 years. Reclose all roads, with sufficient drainage structures, which are opened for project activities. For all temporary roads:
 - obliterate as soon as feasible after use
 - season of use shall be specified to minimize rutting, erosion, sedimentation, and water concentrations
 - plan, locate, design, and construct temporary roads with ease of obliteration as a priority - stockpile topsoil and duff for re-shaping after use or obliteration
 - horizontal and vertical alignments should conform to the natural contour as closely as possible - outsloped rolls in the grade effectively break up water concentrations during use and can be crafted into silt traps and planting pockets during obliteration
4. Wet meadows and dry meadows or scabrock flats would not be skidded across or have landings located within them, unless approved by the hydrologist. BMP VM-2,
5. The following BMP's are identified for the Silvies Canyon Watershed Restoration Project, along with an estimation of the ability to implement them, as well as their anticipated effectiveness, timing and responsibility for monitoring.

T-1 - Timber Sale Planning Process

Estimates will be made on the potential changes to water quality and instream beneficial uses.

Responsibility: Hydrologist and Fisheries Biologist

Timing: Prior to activity

Ability to Implement: High

Effectiveness: High

T-2 - Timber Harvest Unit Design

Unit design will ensure favorable conditions of water flow, water quality, and fish habitat through INFISH RHCAs.

Responsibility: Hydrologist and Fisheries Biologist

Timing: Prior to activity

Ability to Implement: High

Effectiveness: High

T-4 - Use of Sale Area Maps for Designating Water Quality Protection Needs

The Sale Area Map will include locations of streams to be protected and the required harvest method (ephemeral draws would be protected during skid trail/harvester route design, but not under the protected stream course provision).

Responsibility: Presale Technician

Timing: Prior to activity

Ability to Implement: High

Effectiveness: High

T-5 - Limiting the Operating Period of Timber Sale Activities

The Timber Sale Contract (TSC) will specify the Normal Operating Season and soil protection requirements.

Responsibility: Presale Technician and Soil Scientist

Timing: Prior to activity

Ability to Implement: High

Effectiveness: Moderate

T-10 - Log Landing Location

Harvest plans will include proposed landing locations. Landing locations and size will be approved by the Forest Service in advance.

Responsibility: Presale Technician and Sale Administrator

Timing: Prior to and during activity

Ability to Implement: High

Effectiveness: High

T-13 - Erosion Prevention Measures During Timber Sale Operations

Equipment shall not operate when ground conditions are susceptible to detrimental soil disturbances (not more than 20% of the logged area is permitted to have detrimental soil disturbance). Erosion control work will be kept current.

Responsibility: Sale Administrator

Timing: During activity

Ability to Implement: High

Effectiveness: High

T-14 - Revegetation of Areas Disturbed by Harvest Activities

The TSC will include provisions for seeding and fertilizing severely disturbed areas. The Forest Service will designate disturbed areas where seeding and fertilizing are required (generally landing and temporary roads or other areas where more than 200 sq. ft. of exposed mineral soil due to harvest operations).

Responsibility: Presale Technician and Sale Administrator

Timing: Prior to and during activity

Ability to Implement: High

Effectiveness: Moderate

T-15 - Log Landing Erosion Prevention and Control

The Forest Service will designate areas for landing scarification and erosion control seeding as well as any necessary water bars or other drainage structures.

Responsibility: Sale Administrator

Timing: During activity

Ability to Implement: High

Effectiveness: High

T-18 - Erosion Control Structure Maintenance

The Purchaser will provide maintenance of soil erosion control structures as required in the TSC.

Responsibility: Sale Administrator

Timing: During activity

Ability to Implement: Moderate

Effectiveness: High

T-19 - Acceptance of Timber Sale Erosion Control Measures Before Sale Closure

The effectiveness of erosion control measures will be evaluated periodically during the life of the TSC.

Responsibility: Sale Administrator and Hydrologist

Timing: During activity

Ability to Implement: High

Effectiveness: High

T-21 - Servicing and Refueling of Equipment

The Forest Service will designate refueling and servicing areas. A Spill Prevention Control and Countermeasures Plan is required if on site fuel storage exceeds 660 gallons in a single container or if total storage exceeds 1320 gallons.

Responsibility: Sale Administrator

Timing: During activity

Ability to Implement: High

Effectiveness: High

T-22 - Modification of the TSC

The TSC will be modified if new evidence indicates that unacceptable damage is likely to occur as planned.

Responsibility: District Ranger

Timing: During activity
Ability to Implement: High
Effectiveness: High

R-1 - General Guidelines for the Location and Design of Roads
Road reconstruction will assure design creates minimal resource damage.

Responsibility: Engineering Technician
Timing: Prior to activity
Ability to Implement: High
Effectiveness: High

R-2 - Erosion Control Plan
Limit erosion and sedimentation through effective planning and contract administration.

Responsibility: Engineering Technician
Timing: Prior to and during activity
Ability to Implement: High
Effectiveness: Moderate

R-3 - Timing of Construction Activities
Road reconstruction will occur during minimal runoff periods to minimize erosion.

Responsibility: Engineering Technician
Timing: During activity
Ability to Implement: High
Effectiveness: Moderate

R-6 & R-7 - Dispersion of Subsurface and Surface Drainage Associated with Roads
Ditch relief and cross drainage will assure intercepted ground water and surface water is moved from road prism before it develops enough energy to undermine cut slopes or erode fill slopes.

Responsibility: Engineering Technician
Timing: During activity
Ability to Implement: High
Effectiveness: Moderate

R-18 - Maintenance of Roads
Ditches and culverts will be kept open and ruts repaired.

Responsibility: Sale Administrator
Timing: During activity
Ability to Implement: High
Effectiveness: High

R-19 - Road Surface Treatment to Prevent Loss of Material
Watering and grading will be kept on schedule to assure surface material is not lost.

Responsibility: Sale Administrator
Timing: During activity
Ability to Implement: High
Effectiveness: High

R-20 - Traffic Control During Wet Periods
Haul and other associated traffic will be controlled when road damage is likely to occur due to road/weather conditions and only during the time frame from July 1 - October 1.

Responsibility: Sale Administrator
Timing: During activity
Ability to Implement: High
Effectiveness: High

R-21 - Snow Removal Controls to Avoid Resource Damage

Snow removal will assure water can drain from road prism before it develops enough energy to erode road surface or fill slopes.

Responsibility: Sale Administrator

Timing: During activity

Ability to Implement: High

Effectiveness: High

R-22 - Restoration of Borrow Pits and Quarries

Borrow Pits will be stabilized such that banks are stable and access road provides necessary drainage.

Responsibility: Engineering Technician

Timing: During activity

Ability to Implement: High

Effectiveness: High

R-23 - Obliteration of temporary roads

Temporary roads will be obliterated at the completion of their intended use to reduce chronic sediment sources and restore productivity. Effective obliteration is generally achieved through a combination of the following measures: temporary culverts and bridges removed and natural drainage configuration reestablished, road surface ripped, sideslopes reshaped and stabilized, road effectively drained and blocked, road returned to resource production through revegetation (grass, browse, or trees).

Responsibility: Sale Administrator, with advice from hydrologist

Timing: At the completion of activity

Ability to Implement: High

Effectiveness: High

F-1 - Fire and Fuel Management Activities

Activity related fuel will be managed to assure the risk of wildfire is not increased. The timber sale contract will be utilized to ensure that LRMP standards and guidelines for down woody material are met without necessitating additional impacts due to use of machinery. Some slash should be retained on the forwarder trails to reduce the chances of erosion, to trap sediment, and to provide nutrients to the soils for productivity.

Responsibility: Fire Management Officer

Timing: During activity

Ability to Implement: High

Effectiveness: High

F-2 - Consideration of Water Quality in Formulating Prescribed Fire Prescriptions

The prescribed fire plan will be developed to assure fire mortality does not exceed 8% of the tree canopy or remove effective ground cover from more than 3% of the burn area. Fire ignitions will not occur within RHCAs.

Responsibility: Fire Management Officer

Timing: Prior to activity

Ability to Implement: High

Effectiveness: High

F-3 - Protection of Water Quality During Prescribed Fire Operations

The prescribed fire will follow the burn plan. Adjustments will be made during firing operations if objectives are not being met.

Responsibility: Fire Management Officer

Timing: Prior to and during activity

Ability to Implement: High

Effectiveness: High

W-5 - Cumulative Watershed Effects

To ensure that the additional effects of the proposed management activities, when added to the existing conditions, do not exceed thresholds of concern or result in adverse (degraded) water quality or channel/fish habitat conditions.

Responsibility: Hydrologist

Timing: Prior to activity

Ability to Implement: High

Effectiveness: High